Lower birth weight is linked to neurodevelopmental problems

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UiB research shows that being born to term with a weight lower than 3.5

kilos is related to a higher risk of developing neurodevelopmental problems such as cerebral palsy and autism.

In medical research it is well known that being born preterm gives you a higher risk of health issues later in life, including neurodevelopmental disorders such as ADHD and autism. However, most babies that develop neurodevelopmental disabilities are born to term.

Marianna Cortese at the Department of Clinical Medicine wanted to find out if being born at term but with a lower weight, affected the risk of developing these disabilities.

They looked at 1.8 million births from the Medical Birth Registry in Norway. By using the unique personal identifiers assigned at birth they linked the data to other mandatory health and administrative registries. This way they could follow the babies' health into adulthood.

They adjusted for factors such as maternal smoking, marital status of the mother and immigrant status. Those factors had only a trivial impact of the result:

"Compared to babies born with a weight in the range of 3.5–3.9 kg, lower birth weight was associated with an increased likelihood of developing one of the above neurodevelopmental disabilities. We conclude that lower birth weight can be a marker of neurodevelopmental (ND) disabilities independent of preterm delivery," says Cortese.

Up to 25-fold higher risk

The strongest association was for cerebral palsy, with 25-fold increased odds for the lowest birth weights. This was followed by 16-fold for vision/hearing disabilities, 11-fold for intellectual impairment and 7-fold for schizophrenia. For epilepsy the risk was 5.4-fold and for autism

spectrum disorder and other behavioral disorders (including ADHD) it was 3.5-fold.

Cortese adds:

"Despite these large associations and risk increases, low birth weight only explains a smaller proportion of term ND disabilities (the largest proportion was for intellectual disability with 21%), meaning that these are complex multifactorial diseases."

They excluded all the babies with malformations from the study:

"Malformations can be part of syndromes and are associated with neurodevelopmental disabilities. Therefore, we excluded babies with malformations to minimize the possibility that our results could be due to babies with malformations," says Cortese.

The only factor they adjusted for that made an impact on the result was year of birth:

"Year of birth could be capturing trends that are going on related to other risk factors, the occurrence of ND disorders, changes in care, et cetera," Cortese explains.

'Could be a marker of some prenatal problem'

Despite the strong connection between low birth weight and neurodevelopmental disabilities, the researchers don't think that low birth weight is an independent risk factor:

"We believe that lower birth weight indicates that something may have happened during the pregnancy that led to a slower growth and consequently to a lower birth weight, and this event predisposes or

increases at the same time the risk of certain ND disabilities. Low birth weight could thus be a marker of some prenatal insult or problem," she says.

Babies born with a higher weight than normal have also an increased risk for the same disabilities.

As to what are the potential clinical outcomes of this study, Cortese says:

"Hopefully these findings will motivate further research on potential prenatal insults, events, problems, pathologies that could be the underlying cause of some ND disabilities. If these are causes that could be intervened on that means we one day maybe would be able to prevent the occurrence of ND disabilities in some children."

More information: Marianna Cortese et al, Term Birth Weight and Neurodevelopmental Outcomes, *Epidemiology* (2021). DOI: 10.1097/EDE.0000000000001350

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